

At page 2, line 7, please replace the existing paragraph with the following replacement paragraph:

**It is an expensive process to trip out and replace a damaged PDC bit.**

**IN THE CLAIMS**

Please cancel claims 7 and 17.

Claims 5, 11,12,14-16 and 19 remain on file as filed.

Please amend claims 1-4, 6-10, 13, 18, and 20.

Please replace claims 1-4 currently on file with the following replacement claims:

**1. A method for drilling a subterranean formation comprising the steps of:**

**rotating a housing for driving a shearing drill bit at a rotational speed at least equal to a rotational speed of the housing so as to drill the formation;**

**storing potential energy and periodically imparting the potential energy into the drill bit for increasing drilling torque.**

**2. The method of claim 1 wherein the storing and releasing of the potential energy comprises the steps of:**

**rotating an inertial hammer to store potential energy; and periodically impacting the rotating inertial hammer with a rotary anvil on the drill bit to impart the stored potential energy to the drill bit.**

**3. The method of claim 2 wherein the rotary impact is only imparted to the drill bit when the drill bit bears against the formation.**

**4. A method for drilling a subterranean formation with a PDC drill bit depending from a drill string, the method comprising the steps of:**

**providing an assembly adjacent the drill bit;**

**rotating the assembly to rotate the drill bit at a rotational speed at least equal to a rotational speed of the assembly; and**

**rotating a hammer to store potential energy in the assembly; and periodically impacting the rotating hammer with an anvil on the drill bit so as to impart the stored potential energy to the drill bit for increasing drilling torque.**

*MJ*

Please cancel claim 7 and replace claims 6-10 currently on file with the following replacement claims:

**6. A rotational impact assembly for a drill bit comprising:  
a housing adapted to be rotated by a first rotary drive;  
a drill bit extending from the rotating housing for co-rotation at a  
rotational speed at least equal to a rotational speed of the housing; and  
a second rotary drive located in the housing for periodically and  
rotatably impacting the drill bit to increase drilling torque.**

**8. The rotational impact assembly of claim 6 further  
comprising a bit shaft through which the drill bit is rotatably driven, the drill  
bit being adapted for limited rotation relative to the housing so that when  
rotationally impacted, the bit shaft receives the energy substantially  
independent of the housing whereby the drill bit receives substantially all  
energy from the rotary impact.**

**9. The rotational impact assembly of claim 6 wherein the  
second rotary drive is a motor driven by drilling fluids.**

**10. The rotational impact assembly of claim 6 wherein the first  
rotary drive is a rotating end of the drill string.**

Please replace claim 13 currently on file with the following replacement claim

**13. A rotational impact assembly for a drill bit comprising:  
a housing adapted to be rotated by a first rotary drive, the  
housing having a bore;  
a motor located in the bore for rotating a stator shaft;  
a bit shaft extending from the bore of the housing and being  
adapted at a downhole end for rotatably driving the drill bit;  
means for normally driving the drill bit with the housing at a  
rotational speed at least equal to a rotational speed of the housing; and  
means for periodically coupling the stator shaft and bit shaft for  
co-rotation whereby rotational energy is transferred from the stator shaft to  
the bit shaft for increasing drilling torque.**

Please replace cancel claim 17 and replace claim 18 currently on file with the following replacement claim:

**18. The rotational impact assembly of claim 14 further comprising:**

**a carrier driven by the stator shaft for carrying the annular mass about the bit shaft; and**

**an offset pin in the carrier about which the annular mass can pivot between concentric and eccentric positions about the bit shaft so that upon each rotation of the stator shaft, the carrier and annular mass are rotated concentrically so as to cause the hammer and anvil to couple after which the annular mass pivots to the eccentric position so as to decouple the hammer from the anvil.**

*HJ*  
Please replace claim 20 currently on file with the following replacement claim:

**20. The rotational Impact assembly of claim 14 wherein the motor is rotated by drilling fluids flowing to the drilling bit.**

Please add new claims 21 – 27 as follows:

**21. A rotational impact assembly for a drill bit comprising:**

**a housing adapted to be rotated by a rotary drive;**

**a bit extending from the housing and being rotatably driven thereby; and**

**a motor located in the housing, driven by drilling fluids and comprises a stator shaft having a first downhole position and in which a frictional interface is engaged between the stator shaft and the housing to prevent operation of the motor, and a second uphole position in which the frictional interface is disengaged for permitting operation of the motor, for periodically and rotatably impacting the drill bit.**

**22. The method of claim 1 further comprising:**

**rotating a motor in the housing to store potential energy;**

**rotating a inertial hammer with the motor; and**

**periodically impacting the rotating hammer with an anvil on the drill bit.**

**23. The method of claim 22 further comprising providing drilling fluid through the housing to drive the motor.**

**24. The method of claim 22 further comprising flowing drilling fluids to the drilling bit for driving the motor.**

*HAJ*

25. The method of claim 22 further comprising:  
rotating the motor while the drill bit is drilling for performing the storing of potential energy and periodically imparting the stored potential energy into the drill bit; and  
braking the motor while the drill bit is not drilling.

26. The rotational impact assembly of claim 13 comprising means positioned between the housing and the drill bit for permitting limited rotation therebetween so that the drill bit, when impacted, receives substantially all rotational energy from the rotary impact.

27. The rotational impact assembly of claim 26 wherein the rotation limiting means comprises cooperating castellation between the housing and the drill bit.

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#### REMARKS

Applicant appreciates the Examiner's careful review and identification of some 35 USC 112 indefiniteness rejections which are resolved by amendment herein.

Applicant has amended the specification as recommended by the Examiner. Various indefiniteness and antecedent rejections in claims 4,6,9,10 have been corrected affecting claims 4-12.

Claims have been amended as set forth in the remarks.

#### Double Patenting MPEP 706.03(k)

Claim 17 has been cancelled.

#### Objections

Applicant appreciates the Examiner's conditional allowance of Claim 12. New claim 21 is provided which incorporates the subject matter of claims 12, 9 and base claim 6. Applicant has amended indefiniteness regarding first and second rotary drives and thus new independent claim 21 should be in condition for allowance.

Applicant suggests that claim 6 as amended is now allowable and that claims 9 and 12 are also allowable as depending from an allowable claim. The allowability of claim 6 is described below.

Regarding claims 15, 16, 18 and 19, Applicant respectfully contends that base claim 14 is now allowable and thus claims 15,16,18 and 19 are also allowable as depending from an allowable claim 14.

Turning to the rejections is useful to restate some objectives of the method and apparatus set forth in the claims.

As those skilled in the art are aware, the torsional power or energy imparted into rock while drilling is a function of applied torque and the bit's rotational speed. Torque and a nominal rotational speed is typically applied using a drill string